tion by least squares for the eccentricity and the angle of periastron without a preliminary assumption of their values.

The developments here given were suggested by the problem presented by the spectroscopic binary v_4 *Eridani,* which shows two spectra the measures of which indicate nearly circular orbital motion. Altho the method requires more than usual accuracy in the observed velocities, it has been applied to this binary system for the purpose of illustration. The results together with a discussion of the physical constants of the system are given in the following paper.

This paper has been published in full in Lick Observatory Bulletin, No. 274. G. F. PADDOCK.

THE SPECTROSCOPIC BINARY v_4 ERIDANI.

The binary system of v_4 *Eridani* gives two equally bright spectra of Class B9. The hydrogen line Hγ at 4340A is strong and broad and not always measurable. The magnesium line at 4481 A is strong and fairly well defined. Many faint lines are visible on those plates on which the two spectra are coincident. From one of these plates the wave-lengths and identification of 40 lines were determined, showing that the spectrum contains besides hydrogen the enhanced lines of iron, titanium, manganese, chromium, and magnesium. The spectrum is essentially Sirian.

Of the 61 plates obtained of this binary, 39 showed the two magnesium lines at 4481 A distinctly separated. The measures of these alone were used for the solution of the orbit, which was obviously nearly circular. For the derivation of the small eccentricity and nearly indeterminate angle of periastron, the analytic formulæ of the preceding paper were employed. The circumstance that the observed velocities were not sufficiently accurate for the application of these formulæ was set aside in order to illustrate the methods. Two least squares solutions were performed, one for the velocity of the system and ratio of the masses, and one for the orbital elements, with the result that the elements are given for the system and for each component mass on a consistent basis. A comparison of these elements with those of other binary systems shows that this system is one of average and normal values.

The star is not far from the Antapex of the Sun's motion and the observed velocity of the system is practically that due to the solar motion. The density is not improbably low like that of the eclipsing systems. The parallax is unknown, but on the basis of PLUMMER's hypothetical parallaxes for Class A stars, v_4 *Eridani* has a parallax of 0."03 and is one of a star group of similar spectral class and similar motions. On the basis of a probable orbital inclination, low density, and the hypothetical parallax, the physical system of v_4 *Eridani* may be thus described: The component masses are somewhat less massive but slightly larger than the Sun, having an intrinsic luminosity at least eight times that of the Sun and a total luminosity of probably not less than thirty times that of the Sun.

The principal elements are:—

P	$= 5.010$ days
v	$= +17.8^{km}$
m_2 / m_1	$= 0.9832$
e	$= 0.01 \pm$
K_1	$= 63.8^{km}$
k_2	$= 64.8^{km}$
$(a_1 + a_2) \sin i$	$= 8800000^{km}$

This paper has been published in full in Lick Observatory Bulletin, No. 274. G. F. PADDOCK.

NEW LIGHT ELEMENTS AND REVISED ORBIT OF UZ CYGNI.

The publication, in the second part of Volume 69 of the *Harvard Annals,* of more than 3000 observations of eclipsing variable stars permits the revision of many of the orbits published by the writer a year ago.[1] The observations, which were made during the years 1903 to 1912 by Professor WENDELL with a sliding-prism polarizing photometer, represent the best visual photometric work in existence, the probable error of a single set of measures remaining consistently but a little greater than $\pm$ 0.03 mag. Some points of general interest to variable star workers arise in the course of the revisions and are suitable for brief mention in these notes; the detailed revision will be published elsewhere.

[1] *Contributions from the Princeton University Observatory,* No. 3.